



BRAZOS RIVER AUTHORITY HYDROELECTRIC FACILITY

FREQUENTLY ASKED QUESTIONS

March 12, 2010

What is the effect on the electric grid of taking the hydroelectric facility offline?



Possum Kingdom Lake dam

First, it's important to understand the total output of electricity that the facility generated. The hydroelectric facility at Possum Kingdom was designed to generate 24 megawatts (MW) of electricity. To put this in perspective, one must understand the total amount of electric capacity on the grid managed by the Electric Reliability Council of Texas (ERCOT), which carries 85% of Texas' total electric load.

The ERCOT website indicates that the grid has a Total Online Capacity of 72,700 MW. The 24 MW capacity from the hydroelectric facility at Possum Kingdom represents only 0.00003 of the total online capacity. This is less than seven one-thousandths of the capacity of the ERCOT grid.

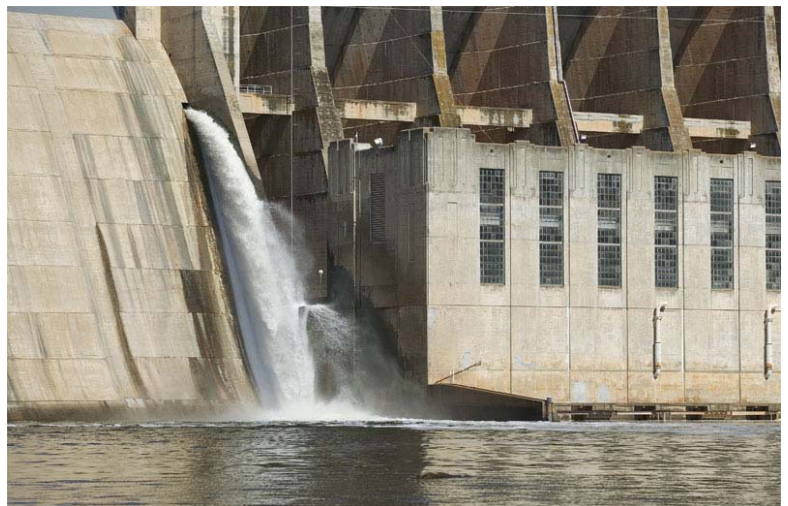
Therefore, the idea that removing the hydroelectric facility from the grid would cause a shortage of electric generation is false due to the relatively small amount of electricity the facility was capable of generating.

Will the shutting down of the hydroelectric units have an effect on the environment, especially as it relates to Golden Algae?

With regard to the environment, the BRA currently maintains a continuous environmental flow release from the dam at Possum Kingdom, and will continue to do so whether the hydroelectric facility is in operation or not.

As to the issue of golden algae, there is no connection between the operation of the hydroelectric units and toxic bloom events. In fact, the worst toxic bloom events occurred in 2005 or earlier, all times during which the hydroelectric facility was in operation.

The BRA recently received a large loan from the Texas Water Development Board to build a water supply project in the Williamson County area in order to keep that area from running out of water in the future. Is this at all related to the hydroelectric facility at Possum Kingdom and would keeping the facility open help the Williamson County area with their water issues?



Possum Kingdom Lake Hydroelectric Powerhouse

There is absolutely no connection between the operation of the hydroelectric units at Possum Kingdom and the Lake Granger Conjunctive Use Project that BRA is pursuing in the Williamson County area, with help from the Texas Water Development Board.

The main reason for this is basic geography. The mainstem of the Brazos River, where Possum Kingdom Lake and the hydroelectric facility are located, does not run through Williamson County ([click here to see a map of the Brazos River basin](#)).

The Williamson County area must rely on water supply sources from the Colorado, Lampasas and San Gabriel River watersheds, along with groundwater. The Brazos River mainstem, because of its distance from Williamson County, is not a practical source of water supply for that area. Therefore the operation of the hydroelectric facility has no bearing on water supplies for Williamson County.

The BRA's efforts to create more water resources for areas like Williamson County are part of the state's overall water planning process. Because Central Texas has such a rapidly growing population, it is estimated that the area will exhaust its current water supplies by 2050.

The pursuit of projects such as the Lake Granger Conjunctive Use project will be a critical step to ensure this area of the basin continues to have adequate and reliable water supply.

What are the water release capabilities at Morris Sheppard Dam at Possum Kingdom Lake?

There are four ways water can be released from Morris Sheppard Dam. All of the release methods work by gravity flow; there is no mechanical (i.e., pump) capacity to move water through or over the dam. Because these are gravity systems, each of the release methods have reduced flows at lower lake levels, as noted below.

- A) **Low Flow Outlets.** There are three low flow outlets. These are the outlets that are normally used to meet the low flow requirements in the Federal Energy Regulatory Commission (FERC) permit. Normally, there is only one low flow outlet open at any given time. Altogether, the low flow outlets have a combined discharge capacity of 297-cubic feet per second (cfs) when the lake is full, down to 194-cfs when the lake is at 987-ft. Because the low flow outlets are located at elevation 976-ft, they cease operating when the lake drops below elevation 976-ft.
- B) **Spillway Gates (also called Bear-Trap Gates or Crest Gates).** There are nine spillway gates. They each have a capacity of up to 8,900-cfs at lake level 999-ft. The spillway gates can be used for water supply releases when the lake is above elevation 987-ft.
- C) **Hydroelectric Turbines (CURRENTLY NOT OPERATING).** There are two hydroelectric turbines. When the lake level is 999-ft, each turbine has a discharge capacity of 1,600-cfs, for a combined capacity of 3,200-cfs. The turbines can operate at lake levels down to approximately elevation 960-ft, at which they each discharge 1,170-cfs. Below elevation 960-ft, the design of the turbines does not allow them to maintain sufficient power quality and stability to avoid "load rejection" by the power grid. Load rejection results in immediate shut down of the turbines, and BRA does not operate the turbines with the lake level below 960-ft.
- D) **Uncontrolled Spillway.** The fourth method to release water from the dam is to use the uncontrolled spillway. The uncontrolled spillway is the large flat area on the south side of the dam cut into rock at elevation 1000-ft. It is only used during floods larger than can be released by the nine spillway gates. In the history of Morris Sheppard, such a flood has not occurred,

but the facilities are in place when needed. For the uncontrolled spillway to be used, all the spillway gates would be open, and the floodwater would continue rising above elevation 1000-ft, at which time the lake would begin discharging over the uncontrolled spillway.

What are the future flow capabilities for the dam?

Should the hydroelectric units remain offline, the remainder of the water release capabilities (low flow and spillway) would still be operational. It is estimated that without the hydroelectric units in operation, in addition to these other methods for releasing water, there would need to be the capability to release up to 2,400-cfs in order to properly manage the system from a water supply standpoint to meet downstream requirements. The Authority is currently in the process of evaluating that issue at this time.



Interior of PK Hydroelectric Powerhouse

How old is the hydro electric plant at Possum Kingdom Lake? How long has it been generating electricity?

The facility was built in 1941, making it nearly 70 years old.

What is the current condition of the hydro facility?

The facility is currently not operational. The Authority had multiple outside engineering firms assess the facility's condition. Upon the recommendation of outside engineering firms and prudent operational guidelines, the Authority took unit #1 off-line in May of 2007 and took unit #2 off-line in August of 2007.

Has the Authority made the decision to decommission and close the hydroelectric facility at Possum Kingdom Lake?

The Authority Board has not made a final decision to decommission and shut down the hydroelectric facility. At our regular public Board meeting in July of 2009, the Board directed

Authority staff to "investigate and initiate the process" of surrendering our FERC license and decommissioning the hydroelectric facility. This was not a directive to actually file a decommissioning application with FERC.

Rather, the Board directed staff to *investigate* decommissioning, which requires a deliberative cost-benefit analysis of decommissioning vs. continuing operations. Staff was directed to study the issue and bring options back to the Board for deliberation prior to moving forward.

With that detailed information, the Board will be able to make an informed decision. The bottom line is, the Authority Board has not made a final decision to decommission and completely shut down the hydroelectric facility.

The Authority issued millions of dollars in bonds related to the hydroelectric facility. Have the funds been used for the facility?

In May 2001, the Authority issued the Series 2001A Water Supply Revenue Refunding and Improvement Bonds in the amount of \$8,925,000. The purpose of these bonds was to fund the

replacement of spillway gates on the Morris Sheppard Dam, work that was required regardless of whether the hydroelectric facility continued to operate or not.



Possum Kingdom Lake gate replacement

The proceeds from this issue were completely expended for that purpose during the period from 2001 through 2005. In December 2005, the Authority issued the Series 2005A Water Supply System Revenue Bonds in the amount of \$12,875,000. The purpose of these bonds were to fund the completion of the replacement of spillway gates on the Morris Sheppard Dam, and dam related facilities including some associated with the hydro-generation operations.

To date, there are remaining proceeds from this issuance of approximately \$3,800,000. These funds have not been spent on any other project. The other bond proceeds have been spent on the authorized improvements for which they were issued.

For additional frequently asked questions regarding Lake Granbury, [click here.](#)

For additional information on the Brazos River Authority, [click here.](#)